

Philad^a 13th March 1855

Dear Sir

I am continuing the preparation of the Fusible alloys as rapidly as I can progress with the test of their accuracy. I do not think it advisable to melt more than 50 lbs at a melt, because of their liability to alter in greater masses during the operation of casting. My plan is to cast small trial pieces at the beginning and end of each melt, and to test these separately, to determine their accuracy before stamping them. I find I can scarcely test more than three melts or 150 lbs, per day. I have now some 1500 to 1800 lbs ready, but not perhaps in suitable form. Having thus far used only the worn-out shoe-moulds of the Mint. I have one set of moulds made, which cast pieces of about 4 lb. each; but as this will often prove heavier than necessary, and frequent remelting in unskilful hands might injure the metal, I propose with your permission procuring a dozen moulds to cast one-pound pieces. In filling an order, I would send some of each size.

I received yesterday the enclosed letter from a supervising inspector, and scarcely know how to answer the query in relation to apparatus. Altho' I believe Evans' guard to be very convenient, perhaps perhaps the most convenient arrangement, yet, as stated in former communications, it is not the only form which can be adopted. It requires only a mechanical by which motion, produced upon the melting of the alloy in a steam-tight tube in the boiler, shall be communicated to an alarm. I drew your attention to a suggestion of Prof. A D Backe on this subject, about the time when I commenced my experiments on the alloys, & subsequently tested it with satisfactory results. May I suggest therefore, dear Sir, the propriety of the Dep^y making application to Prof. Backe, and further to take sound legal advice as to the

right of the Govt. to employ his method without conflicting with Grant's Patent.

After I shall have prepared a fair stock of the various alloys, I wish to devote some time to testing forms of apparatus for using the alloys; but at present all the time of 3 or 4 persons is employed in making and testing the alloys. Having little confidence in my mechanical skill and ability, my desire is to employ a person in this city, on whose skill I can rely, to make various arrangements for using the alloys, after deciding upon any one or more forms, which may prove successful, to make arrangements with him for their manufacture at a simple remunerating price. We might then send the alloys and apparatus together. — In the mean time, I am at a loss what to answer the query in the enclosed letter. Please return the letter with your reply, that I may answer it.

Since the alloys are liable to alterations if not carefully remelted, which must be done by the Inspectors, general or local, I suggest the propriety of having some short instructions on this subject printed, and of sending a copy or copies with every lot of alloys dispatched. A single sheet would be ample enough.

— I am clearly of the opinion that for the greatest safety, the tube containing the alloy should not merely enter into the steam-space, but should touch the upper flues of a boiler, if it have such flues. For I feel pretty sure that the overheating of these flues is the most prolific source of danger, even when there is otherwise sufficient water in the boiler. If you wish me to give my reasons for this belief more in detail, I will do so with pleasure. If my views should be correct, then the instructions to make the tubes touch the flues should accompany the instructions relative to the remelting of the alloys.

As I can see my way pretty clearly in preparing the alloys for use in a short time, a few preliminaries are requisite lest I should go astray. Boxes or kegs must be obtained to contain them; the latter being preferable for quantities from the convenience of rolling them. Should bills for this and other items be forwarded to the Department or shall I cash them, & present them at the close of the quarter? — again, since I am neither personally nor officially acquainted with the Supervising Inspectors, it would be more proper that I should receive orders for the alloys from them exclusively through the medium of the Dept. Further, may the alloys be sold to persons who ask for them; and if so under what conditions and circumstances? These queries suggest themselves to me, and I solicit the favor of a reply from the Dept.

I have the honor to be, dear sir,
Yr Obedt Servt.
Hon Jas Guthrie
Secretary of the Treasury
U.S.
Jas C Booth

1855
March 13th
J.C.B. to Sec. Treas.